AF/3617

120

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, PO Box 1450, Alexandria, VA, 22313-1450; on

March 22, 2004
(Date)

Albert W. Watkins
Name of applicant, assignee, of registered representative

Signature Date of Signature 22mr04

APPEAL FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re:

Serial #:	09/756,688
For:	Removable Bearing Assemblies
Filed:	January 9, 2001
Inventor:	Richard L. Fisher
GAU:	3617
Examiner:	Avila
Docket #:	Fisher-001221

RECEIVED
MAR 2 9 2004
GROUP 3600

REQUEST FOR EXTENSION OF TIME

The appellant herewith petitions the Commissioner of Patents and Trademarks to extend the time for filing the appeal brief for 4 months from December 22, 2003 to March 22, 2004. Please charge my deposit account number 17-0155 in the amount necessary to cover the cost of the extension. The applicant is a small entity.

APPEAL TO THE BOARD OF APPEALS

Appellant respectfully appeals from the Examiner's final rejection of claims 21 - 31 and 38 - 72.

Please charge all fees for this correspondence to deposit account 17-0155.

03/29/2004 AWONDAF1 00000056 170155 09756688
01 FC:2402 165.00 DA

1. REAL PARTY IN INTEREST

The present patent application is owned by the above named inventor.

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences.

RECEIVED
MAR 2 9 2004
GROUP 3600

3. STATUS OF CLAIMS

Claims 21 - 31 and 38 - 72 are pending. Each of these claims stand finally rejected, and are the subject of the present appeal.

4. STATUS OF AMENDMENTS

No amendments are pending.

5. SUMMARY OF THE INVENTION

The Invention, Generally

This invention pertains generally to the field of marine propulsion systems, and more specifically to marine propulsion systems utilizing an elongated propeller drive shaft having a housing surrounding the propeller shaft. Boats of this industry are commonly referred to as mud

boats, since these boats are designed for traversing shallow waters, swamps, and other muddy waters (specification pg. 2, lines 16 - 18). The present invention combines a removable bearing (200, fig 1), propulsion motor (110, fig 1), elongate propeller shaft (130, fig 1), and an elongate casing surrounding the elongate shaft (140, fig. 1). The combination enables, for the first time in the mud boating industry, the use of serviceable ball bearings that are streamlined with the casing, and replaces the industry standard bushings of the prior art.

Exemplary Claim 21

A drive assembly for a marine mud motor (100 in fig 1, pg 2, lines 12-18) comprising:

a) an elongate drive tube (140, fig 1), configured for rotatably receiving a drive shaft (130, fig 1) therethrough, wherein a lower end of the drive tube includes;

b) a drive assembly housing (200, fig 1), having a lower end;

c) a bearing (260 - 264, fig 2), in rotational communication between the drive assembly housing and the drive shaft (page 10, lines 12 - 13); and

d) a seal (230, 235, fig 2), contained within the drive assembly housing, configured to restrict contaminants from entering the drive assembly housing (page 9, last line - page 10, first line).

6. ISSUES

A. Whether under 35 U.S.C. § 112, first paragraph, claims 21 - 31, 38 and 39 constitute new matter. Present claims 21 - 24 correspond to claims 1 - 4 of United States Patent 6,361,388 B2 to Foreman, which was first published as publication number US 2001/0041482.

Present claims 25 - 30 correspond to claims 6 - 11 of that same patent. Present claims 38 - 52 were drafted during prosecution to serve as counts upon which an interference could be invoked, but are not identical to the claims of that patent. All claims were drafted within one year of the publication date of the above referenced Foreman published application.

B. Whether under 35 U.S.C. § 102(e) claims 21 - 31, 38 and 39 are unpatentable over Foreman 6,361,388.

C. Whether under 35 U.S.C. § 102(b) claims 40 - 52 and 63 - 71 are clearly anticipated by Lovell.

D. Whether under 35 U.S.C. § 103(a) claims 53 - 62 and 72 are unpatentable over Lovell in view of Hulsebus et al.

7. GROUPING OF CLAIMS

For the purposes of this appeal, with regard to issue A the Board will recognize that the question of new matter pertains to each element the Examiner has identified as new matter. Consequently, the Board is respectfully requested to consider each of the claims separately with regard to this issue. With regard to issue B, each of these claims will stand and fall with respect to the outcome of issue A. Consequently, separate consideration of each claim simultaneous with issue A is most respectfully requested. With regard to issues C and D, each of the dependent claims will stand and fall together with the associated independent claims. While the dependent claims define the invention in more distinctive terms for which separate novelty is claimed, the issues for which relief is sought herein are to be found in the independent claims. Claims 40 and 46 will stand or fall together, but the remaining independent claims 53, 63 and 72 will not stand and fall therewith, owing to the differences in content therein and as described in section 8 herein below.

8. ARGUMENTS

I. REJECTIONS UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

Claims 21 - 31, 38 and 39 stand rejected under 35 U.S.C. §112, first paragraph as

containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

The Examiner states in the outstanding office action that the specification does not clearly provide a marine mud motor, a drive tube that includes a drive assembly housing, a bearing in rotational communication between the drive assembly housing and the drive shaft, and a seal configured to restrict contaminants from entering the drive assembly housing, as claimed. Several declarations were previously submitted by the appellant and Mr. Mark Fisher which establish that the words "mud motor" are common language used to refer to applicant's invention in the industry, at item 3 in the Richard Fisher declaration. Both declarations further establish the interchangeable nature of the remaining words or phrases. As aforementioned, the drawings of the Foreman patent and present application, which are strikingly similar, further establish the identity of the words, through their association with like or identical components.

The declarations establish the interchangeable nature of the words as they are understood in the industry, with respect to the features cited by the Examiner. Appellant's representative observes that the rejection under 35 U.S.C. §112, first paragraph is statutorily based upon what the subject matter would reasonably convey to one skilled in the relevant art. With each component clearly illustrated within the drawings, the appellant's representative contends that these drawings alone provide sufficient descriptive support to one skilled in the relevant art. Nevertheless, the present declarations establish that the words themselves are also readily recognized as interchangeable, and would most certainly convey the same meaning to one skilled in the art. The statute does not require identical words to be used, but instead addresses what the subject matter would reasonably convey to one skilled in the art. If 35 U.S.C. §112 did require

identical verbiage, the Board will immediately recognize that no interference would ever be possible, always owing to lack of enablement under 35 U.S.C. §112. Alas, at least one element or component in every potential interference is bound to be described using a different name or title. Each applicant is permitted to be his own lexicographer. To borrow a well-known phrase, a rose by any other name is still a rose. Such it is with the present application and the Foreman patent. This fact will be at once recognized by those skilled in the art upon a review of the present disclosure and the granted patent. Consequently, and with respect to the phrases specifically identified in the declarations as being recognized as interchangeable to those of ordinary skill in the art and for which the drawings illustrate like or identical components, the Board is respectfully requested to withdraw the outstanding rejection under 35 U.S.C. §112, first paragraph with respect to claims 21 - 31.

In the outstanding action, the Examiner states on page 5 in lines 4 - 5 that "the statements in the affidavits are self serving statements." While this is certainly the case, the appellant and his representative do not believe such statements, whether self serving or otherwise, should be disregarded. Such would fly in the face of affidavit practice as it exists before the Patent Office. Nevertheless, appellant's representative has provided under separate cover but forwarded simultaneous herewith an additional set of declarations made by two individuals very experienced in the marine industry and familiar with the terminology used therein. These individuals recognize the same identity recognized by the appellant. These declarations were not earlier forwarded because the Examiner first objected to the declarations by the appellant and his partner as being self-serving. Consequently, consideration of these in the present appeal is respectfully requested, and appropriate. Nevertheless, the support discussed herein, originally presented in the present application as filed, and the declarations previously submitted

independently provide the support required by the statutes.

With regard to the drive assembly housing and drive tube being an integral unit, the corresponding reference between Foreman's "drive assembly housing 42" is to applicant's "bearing housing 210". The Board will observe that bearing housing 210 is the housing alone, and consequently does not include the bearings themselves. This is, of course, true of the Foreman patent as well, where drive assembly 20 includes the various additional components, while drive assembly housing 42 is only the housing. The Board will observe that both Foreman and the present applicant contemplated making the drive tube integral with this component (Foreman's "drive assembly housing 42" and applicant's "bearing housing 210"), as noted by the applicant on page 11, lines 6 - 7 of the applicant's specification.

With the reference to the diameters referred to by the Examiner referencing Foreman's claim7, which requires the inside diameter of the enlarged assembly housing be larger than the inside diameter of the elongate drive tube, applicant's representative acknowledges that this recitation requires external threading which is not illustrated in figure 3. Nevertheless, the present appellant teaches the use of a female coupling on an otherwise nearly identical bearing unit 300 illustrated in figure 6. The requirement under 35 U.S.C. §112, first paragraph is statutorily based upon what the subject matter of the present application would reasonably convey to one skilled in the relevant art. It is the position of the appellant's representative that the use of a female coupling for the lower bearing recited in the claims is more than adequately taught in the present specification by figure 6 and the associated discussion of the use of the female connection to casing 140 described in the text on page 11 between lines 15 and 22:

> Figures 5 - 7 illustrate a preferred top bearing unit 300, which resembles bottom unit 200 in most features, which will not be repeated herein. The corresponding drawing elements are identified by the second and third digits of the element numbers between the two units. However, a few features are

> somewhat different. As can be seen, threads 313 form a female connection to casing 140, which will be exterior threaded. This arrangement assists with draining water from the bearing unit and threads, since casing 140 will be lower than bearing unit 300, and will therefore drain water from threads 313. With this arrangement, a stop 318 may optionally be provided past which casing 140 may not pass, but through which shaft 130 will pass.

The Board will recognize that this section of text teaches the female coupling to those skilled in the art, and the text also clearly identifies the optional nature of stop 318. Following the teachings of appellant's own specification, one skilled in the art is clearly enabled to use the female connection without stop. Consequently, the disclosure does enable one skilled in the art to select a housing inside diameter larger than the inside diameter of the drive tube.

With reference to the bearing having an outside diameter greater than the inside diameter of the drive tube, the appellant's representative maintains that figure 3 does illustrate this feature. The Board will recognize that, in order to be functional, bearings 260 - 264 on their outside diameter must engage with the inside diameter of bearing compartment 215. Consequently, the outside diameter of the bearings is equal to the inside diameter of bearing compartment 215. From the figure, the Board will also recognize that the inside diameter of casing 140 must be slightly less than the outside diameter of threads 212, in order for casing 140 to engage these threads. Consequently, casing 140 cannot have an inside diameter which is even as large as the outside diameter of threads 212. Casing 140 has an inside diameter smaller than threads 212, and the bearings have an outside diameter equal to the inside diameter of bearing compartment 215. The Board will clearly observe that the bearing compartment 215 inside diameter as illustrated is larger than the outside diameter of threads 212. Consequently, the outside diameter of bearings 260-264 must be greater than the inside diameter of the drive tube, as recited by the claims.

While the appellant's representative believes the drawing to be adequate for illustrating this feature, the Board does not have to rely upon the drawing figures to reach this same

conclusion. The Board is referred to lines 7 - 9 on page 9 of applicant's specification, which states: "Using bearings without a race provides a size advantage, since, without bearing races, bearing housing 210 may be made with a much smaller outside diameter more closely resembling or even the same as casing 140." The Board will observe that this section of text is referring to the smallest possible outside diameter for bearings 260 - 264, and, that, even with the smallest outside diameter for the bearings, the bearing outside diameter will still be at least as great as the inside diameter of the drive tube. With the inclusion of races, the bearings will have a much greater diameter than inside diameter of the drive tube. Finally, figure 6 additionally teaches the use of a bearing having an inside diameter which is clearly greater than the outside diameter of the drive tube. Consequently, the appellant's representative respectfully points out that three different parts of the present specification disclose and/or teach the use of a bearing having an outside diameter greater than the inside diameter of the drive tube.

In view of the enablement provided by the teachings of applicant's top bearing housing 300, which illustrates the external threads, claims 5 and 12 were copied as claims 38 and 39. These claims are rewritten versions of the Foreman claims that instead use the words of the appellant's specification.

For these aforesaid reasons, the appellant respectfully requests relief from the Examiner's final rejection by the Board of Appeals of the rejections based upon 35 U.S.C. 112, first paragraph.

II. REJECTIONS UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

There are no outstanding rejections with basis in this section of the statutes.

III. REJECTIONS UNDER 35 U.S.C. § 102

35 U.S.C. §102(e)

Claims 21 - 31 stand rejected under 35 U.S.C. §102(e) as being clearly anticipated by Foreman. Appellant maintains that the history and correspondence from him to Mr. Foreman resulted in Mr. Foreman adopting many of his concepts verbatim, leading ultimately to the present situation. Consequently, the requirement of the statute that the invention be described by another and filed ***before the invention thereof by the applicant*** cannot have been fulfilled in the present case. Appellant has long ago submitted prima facie evidence of the same, including a newspaper article and three affidavits. The appellant certainly has additional information detailing the long and checkered history between the appellant and Mr. Foreman, which will form the documentation most appropriate for an interference. In view of the lack of basis by the Examiner to contradict the evidence previously submitted, the appellant respectfully requests relief from the Examiner's final rejection by the Board of Appeals of the rejections based upon 35 U.S.C. §102(e).

35 U.S.C. §102(b)

Claims 40 - 52 and 63 - 71 stand rejected under 35 U.S.C. §102(b) as being clearly anticipated by Lovell. The Board will recognize that the Lovell patent does not illustrate nor teach the use of a bearing structure. Instead, Lovell illustrates a bushing. This bushing cannot, therefore, be in rotational communication between bearing housing and propeller shaft as recited in paragraph (C) of independent claims 40 and 46, but must instead slide therebetween.

Furthermore, the Lovell construction will be unsuitable for application with mud motors, owing to the separate anchoring of outer housing 24 through strut 12. The present independent claim 63 recites the elongated shaft and casing and the removable bearing housing, the challenges for use which are well described in the present application, and recitations that the housing be supported by the casing. These features, and others found in these present claims, including the independent claims, are not taught or suggested by Lovell. The appellant therefore respectfully requests relief from the Examiner's final rejection by the Board of Appeals of the rejections based upon 35 U.S.C. §102(b).

IV. REJECTIONS UNDER 35 U.S.C. § 103

Claims 53 - 62 and 72 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lovell in view of Hulsebus et al. The Board will understand that in ordinary outboard motors, the housing adjacent the propeller is very well oiled, typically by a relatively small casing filled with oil. Consequently, moisture penetration is prevented by this very substantial oil barrier. However, in the case of the elongate shaft and casing recited in claim 53, the filling of such casing with oil is not only impractical, it is very inappropriate. Were it to be filled with oil, the impacts which are all to often encountered during shallow water boating, where these elongated shafts and casings are found and to which the present invention pertains, would be seriously worsened owing to the undesirably increased mass. Furthermore, there would be an associated oil spill of obviously very large magnitude in the event of damage to any of the propulsion components. Those familiar with boating recognize that oil will spread to only a few molecules thick, and, upon so doing, will isolate the water surface from exposure to vital oxygen. The

impact on marine creatures has been very well documented. Yet, the substantial oil that would be required to fill the space within the casing would cover many, many square yards of surface. Since filling with oil has been impractical in the prior art, bushings have been heretofore necessitated. Neither Lovell nor Hulsebus et al illustrate or teach the combination of elongate drive shaft and elongate casing recited herein, nor would a combination of these references teach to one skilled in the art the presently recited combination, owing to the issue with the oil just described.

The provision of the present removable housing, recited in both claims 53 and 72, permits ready repair and replacement even when the bearings seize. Bushings, as taught by Lovell and adopted by the prior art, do not normally destructively seize. Bearings, in contrast and as will be recognized, do seize. They seize no matter how well the apparatus is maintained, due to the influx of water and in spite of the best of seals. It is simply a matter of time. When this occurs, using a non-removable housing, the housing must often be rebuilt or replaced, which is a large and expensive task. Furthermore, the replacement parts are too large to reasonably ship. So, when an enthusiast has traveled some distance to enjoy the shallow waters, using the prior art approaches, a bearing failure would have completely disabled the boat and in many cases required the boater to return home for full repairs or replacement. Using the removable housing as recited in the present claims 53 and 72, the enthusiast will merely detach, such as by unthreading in the preferred embodiment, replace the faulty bearings, and, if necessary, the removable housing, and be off and running. The removable housing and bearings are sufficiently small to be shipped overnight to most anywhere, and the replacement may be made anywhere, so long as even rudimentary tools are available. In contrast, the Lovell patent does not illustrate a removable housing, but instead has a fixed housing 24 which is permanently attached to the boat

through strut 12. Nor does Hulsebus. Consequently, neither Lovell nor Hulsebus et al illustrate or teach this feature which is recited in the claims at issue.

For these aforesaid reasons, the appellant respectfully request relief from the Examiner's final rejection by the Board of Appeals of the rejections based upon 35 U.S.C. 103.

V. REJECTIONS FOR OTHER REASONS

There are no outstanding rejections based upon reasons other than those listed above.

CONCLUSION

For the reasons outlined herein above, the Board of Appeals is requested to consider and reverse the rejections by the Examiner. An appendix of all pending claims is attached.

Respectfully,

Albert W. Watkins
reg. no. 31,676
(320) 363-7296

APPENDIX OF CLAIMS

The claims, as they are at the time of appeal.

21. A drive assembly for a marine mud motor, comprising:

a) an elongate drive tube, configured for rotatably receiving a drive shaft therethrough, wherein a lower end of the drive tube includes;

b) a drive assembly housing, having a lower end;

c) a bearing, in rotational communication between the drive assembly housing and the drive shaft; and

d) a seal, contained within the drive assembly housing, configured to restrict contaminants from entering the drive assembly housing.

22. A drive assembly as in claim 21, further comprising a seal cap, coupled to the lower end of the drive assembly housing, configured for retaining the seal within the drive assembly housing.

23. A drive assembly as in claim 22, wherein:

a) the lower end of the drive assembly housing has screw threads; and

b) wherein the seal cap has screw threads, to allow the seal cap to be threadably connected to the lower end of the drive assembly housing.

24. A drive assembly as in claim 22, wherein the seal cap includes at least one seal contained within the seal cap.

25. A drive assembly as in claim 21, wherein the drive assembly housing and the drive tube are an integral unit.

26. A drive assembly for a marine mud motor, comprising:

a) an elongate drive tube having an inside, an outside and a lower end, configured for rotatably receiving a drive shaft therethrough, wherein the lower end of the drive tube includes;

b) an enlarged drive assembly housing having an inside, an outside, an upper end and a lower end, wherein the inside diameter of the enlarged assembly housing is larger than the inside diameter of the elongate drive tube;

c) a bearing, in rotational communication between the enlarged drive assembly housing and the drive shaft; and

d) a seal, contained within the enlarged drive assembly housing, configured to restrict contaminants from entering the enlarged drive assembly housing.

27. A drive assembly as in claim 26, wherein the bearing includes an outside diameter larger than the inside diameter of the drive tube.

28. A drive assembly as in claim 26, further comprising a seal cap, coupled to the lower end of the enlarged drive assembly housing, configured for retaining the seal within the enlarged drive assembly housing.

29. A drive assembly as in claim 26, wherein:

a) the lower end of the enlarged drive assembly housing has screw threads; and

b) wherein the seal cap has screw threads, to allow the seal cap to be threadably coupled to the lower end of the enlarged drive assembly housing.

30. A drive assembly as in claim 28, wherein the seal cap includes at least one seal contained within the seal cap.

31. A drive assembly as in claim 26, wherein the enlarged drive assembly housing and the drive tube are an integral unit.

38. A drive assembly as in claim 21, wherein the drive assembly housing further comprises an inside and the elongate drive tube has an outside, and wherein the inside of the drive assembly housing is coupled to the outside of the elongate drive tube.

39. A drive assembly as in claim 27, wherein the inside of the enlarged drive assembly housing is coupled to the outside of the elongate drive tube.

40. A sealed bearing unit for a marine propulsion system, comprising:

a) an casing, configured for rotatably receiving a propeller shaft therethrough, wherein a lower end of the casing includes;

b) a bearing housing, having a lower end;

c) a bearing, in rotational communication between the bearing housing and the propeller shaft; and

d) a seal, contained within the bearing housing, configured to restrict contaminants from

entering the bearing housing.

41. A sealed bearing unit as in claim 40, further comprising a cover, coupled to the lower end of the bearing housing, configured for retaining the seal within the bearing housing.

42. A sealed bearing unit as in claim 41, wherein:

a) the lower end of the bearing housing has screw threads; and

b) wherein the cover has screw threads, to allow the cover to be threadably connected to the lower end of the bearing housing.

43. A sealed bearing unit as in claim 41, wherein the cover includes at least one seal contained within the cover.

44. A sealed bearing unit as in claim 40, wherein the bearing housing and the casing are an integral unit.

45. A sealed bearing unit as in claim 40, wherein the bearing housing further comprises an inside and the casing has an outside, and wherein the inside of the bearing housing is coupled to the outside of the casing.

46. A sealed bearing unit for a marine propulsion system, comprising:

a) an casing having an inside, an outside and a lower end, configured for rotatably receiving a propeller shaft therethrough, wherein the lower end of the casing includes;

b) an enlarged bearing housing having an inside, an outside, an upper end and a lower end, wherein the inside diameter of the enlarged assembly housing is larger than the inside diameter of the casing;

c) a bearing, in rotational communication between the enlarged bearing housing and the propeller shaft; and

d) a seal, contained within the enlarged bearing housing, configured to restrict contaminants from entering the enlarged bearing housing.

47. A sealed bearing unit as in claim 46, wherein the bearing includes an outside diameter larger than the inside diameter of the casing.

48. A sealed bearing unit as in claim 46, further comprising a cover, coupled to the lower end of the enlarged bearing housing, configured for retaining the seal within the enlarged bearing housing.

49. A sealed bearing unit as in claim 46, wherein:

a) the lower end of the enlarged bearing housing has screw threads; and

b) wherein the cover has screw threads, to allow the cover to be threadably coupled to the lower end of the enlarged bearing housing.

50. A sealed bearing unit as in claim 48, wherein the cover includes at least one seal contained within the cover.

51. A sealed bearing unit as in claim 47, wherein the inside of the enlarged bearing housing is coupled to the outside of the casing.

52. A sealed bearing unit as in claim 46, wherein the enlarged bearing housing and the casing are an integral unit.

53. A marine propulsion system having a power source, an elongate rotary drive shaft, an elongate casing surrounding said rotary drive shaft, and a propeller, wherein the improvement comprises:

ball bearings and bearing races which are adapted to separate said drive shaft from said casing;

a housing about said ball bearings and bearing races supported by and removably attached to said casing at a first end and having a first opening adjacent said casing and a second opening;

a removable cover adapted for enclosing said housing second opening and providing access to said ball bearings and bearing races;

whereby said housing and removable cover isolate said bearings from an environment exterior of said housing.

54. The marine propulsion system of claim 53, wherein said rotary drive shaft passes through said casing, said bearings, said housing, and said removable cover.

55. The marine propulsion system of claim 54, wherein said housing further comprises threads formed on an exterior diameter of said housing for threadably attaching to mating threads

formed on an inside diameter of said casing.

56. The marine propulsion system of claim 55, wherein said removable cover further comprises threads for attaching to said housing.

57. The marine propulsion system of claim 56, wherein said casing, said bearings, said housing, and said removable cover are concentric about said rotary drive shaft.

58. The marine propulsion system of claim 53, wherein said second opening is larger than said ball bearings and bearing races, whereby said ball bearings and bearing races may be removed through said housing.

59. The marine propulsion system of claim 53, wherein said first opening provides access to a side of said ball bearings and bearing races, whereby said ball bearings and bearing races may be pushed from said first opening towards said second opening.

60. The marine propulsion system of claim 59 wherein said housing has an inside diameter adjacent said casing which is greater than an inside diameter of said ball bearings and bearing races.

61. The marine propulsion system of claim 53, further comprising at least one shaft seal adjacent said cover, whereby moisture will be inhibited from passing between said shaft and said cover into said housing by said shaft seal.

62. The marine propulsion system of claim 55, wherein said housing comprises a threaded male connector extending between said casing and said shaft for removably attaching said housing to said casing.

63. A marine propulsion linkage for connecting a propeller to a motive power source, comprising:

a shaft adapted for rotation about a first axis having a first end and elongated along said first axis from said first end to a second end, said first and second ends terminating said shaft;

a means for coupling said shaft to said propeller adjacent said second end;

a means for coupling said shaft to said motive power source adjacent said first end;

a casing generally concentric with said shaft and elongated along said first axis having a first end adjacent said shaft first end and a second end adjacent said shaft second end;

a framework attached to said casing and maintaining said casing between said propeller and said motive power source;

a bearing housing removably attached to and supported by said casing.

64. The marine propulsion linkage of claim 63, wherein said shaft has a maximum radius from said first axis and said casing has a minimum inside diameter greater than said maximum radius.

65. The marine propulsion linkage of claim 63, wherein said casing fully circumscribes said shaft.

66. The marine propulsion linkage of claim 63, wherein said casing has an exterior profile in the general direction of travel through the water and said housing has a profile similar to said casing profile, so as to prevent the generation of shallow water spray.

67. The marine propulsion linkage of claim 63, wherein said bearing housing has a body which surrounds and locates at least one bearing outer race at said casing second end.

68. The marine propulsion linkage of claim 63, wherein said bearing housing further comprises a nose portion with an outside surface adapted for sealing engagement with said casing

69. The marine propulsion linkage of claim 63, wherein said bearing housing nose portion threads onto said casing.

70. The marine propulsion linkage of claim 63, wherein said bearing housing further comprises an inside surface concentric to said shaft within which said shaft passes.

71. The marine propulsion linkage of claim 67, further comprising a second bearing housing removably attached to said casing adjacent said casing first end and containing at least one bearing outer race and bearing therein through which said shaft passes and further comprising a fluid seal to obstruct the passage of moisture through said second bearing housing into a cavity between said casing and said shaft.

72. A marine propulsion system having a power source, a rotary drive shaft, a casing

surrounding said rotary drive shaft, and a propeller, wherein the improvement comprises:

ball bearings and bearing races which are adapted to separate said drive shaft from said casing;

a housing about said ball bearings and bearing races, attached to said casing at a first end and having a first opening adjacent said casing and a second opening;

a removable cover adapted for enclosing said housing second opening and providing access to said ball bearings and bearing races;

at least one shaft seal adjacent said removable cover, operatively inhibiting moisture from passing between said shaft and said cover into said housing;

whereby said housing, said removable cover and said shaft seal isolate said bearings from an environment exterior of said housing.